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10/705,604

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EXAMINER

LIN, JAMES

ART UNIT

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1762

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/705,604	Applicant(s) YAMAZAKI ET AL.	
	Examiner Jimmy Lin	Art Unit 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2007.  
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.  
 4a) Of the above claim(s) 4,5,8,9,12,13,18,19 and 29 is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-3,6,7,10,11,14-17 and 20-28 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 29 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☒ All b) ☐ Some \* c) ☐ None of:  
 1. ☒ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/10/03, 3/22/04, 6/22/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Group I, claims 1-28 in the reply filed on 3/26/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 4-5, 8-9, 12-13, 18-19, and 29 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 3/26/2007.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
5. Claims 1-3, 6-7, and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (U.S. Publication No. 2002/0075422, as provided by Applicant) in view of Kawase (GB 2,360,489) and Morii (JP 2001-276726).

Kimura teaches a method of making an electroluminescent (EL) display device [0122]. In the embodiment of Fig. 8, an EL solution 114A is ejected towards the pixel electrode 141, wherein the pixel electrode is turned to face downward [0170].

Kimura does not explicitly teach ejecting under a pressure lower than atmosphere pressure.

Kawase teaches the problem of nucleation of EL droplets deposited via an ink jet method. After the deposition of the EL droplets, the edges of the deposited material dry faster while the center of the droplet has a high vapor concentration which inhibits drying, thus resulting in a droplet with a higher concentration of the EL material on the outer edge and less at the center. Such a result would produce a non-uniform EL layer (2<sup>nd</sup> full paragraph on pg. 8 and paragraph bridging pg. 8-9). This problem can be avoided by increasing the drying speed of the deposited material (1<sup>st</sup> full paragraph on pg. 9). Kawase teaches that a flow of gas across the substrate and heating of the substrate during deposition can increase the drying speed, but does not explicitly teach the use of a vacuum.

Morii teaches a method of evaporating a solvent from an EL layer via a vacuum [0009],[0012].

Because Kimura teaches the need to form a uniform EL layer [0160], it would have been obvious to one of ordinary skill in the art at the time of invention to have provided a vacuum during the ejection of the EL solution of Kimura with a reasonable expectation of success because Kawase teaches the need to increase the drying speed during ejection in order to form a uniform EL layer and Morii teaches that drying of EL solution can be accomplished via a vacuum atmosphere. One would have been motivated to do so in order to have formed a more uniform EL layer. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Claims 2,22-23: Morii does not explicitly teach a vacuum pressure in the claimed range. However, Morii does teach that some solvents may freeze in a reduced pressure atmosphere [0009],[0023], so one of ordinary skill in the art would have to find a vacuum pressure that optimizes drying speed while preventing freezing of the solvent. A particular parameter can be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, and

the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation (see MPEP 2144.05.II.B.). It would have been obvious to one of ordinary skill in the art at the time of invention to have adjusted the vacuum pressure, including those in the claimed range, through routine experimentation in the method of forming the EL layer of Kimura. One would have been motivated to do so in order to have optimized the pressure to find an optimal drying speed without freezing the solvent. Alternatively, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical (MPEP 2144.05.II.A.). This decision is clearly analogous to pressure differences and other process parameters. It would have been obvious to one of ordinary skill in the art at the time of invention to have used any vacuum pressure, including those in the claimed range, that causes the evaporation of solvent.

Claim 3: Kimura, Kawase, and Morii do not explicitly teach volatilizing the solvent in solution in a duration before the solution arrives at the electrode. However, the Applicant's specification seems to suggest that the vacuum causes the volatilizing of the solvent (see, e.g., pg. 11, lines 2-10 of present specification). Since the EL solution of Kimura is ejected into a vacuum, the solvent from the EL solution must necessarily volatilize before the solution arrives at the electrode.

Claims 6-7: Kimura teaches that the substrate can be 0° relative to the horizontal plane (Fig. 8).

Claims 24-26: Kimura teaches that the EL composition is intermittently deposited through a nozzle to form a thin film ([0136]; Fig. 8).

Claim 27-28: Kimura teaches that the EL composition can be a hole injection material [0171].

6. Claims 1-3, 6-7, and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa (U.S. Publication No. 2003/0166311) in view of Sekiya (JP 2003-264072).

Miyazawa discloses a method of making an EL element. The EL material can be ejected onto a pixel electrode 141 under a high vacuum ([0090]-[0093]; Fig. 5).

Miyazawa does not explicitly teach that the EL material is ejected from below. However, Sekiya teaches that ejecting droplets of a solution, such as an EL solution, from the underside of a substrate can avoid the adherence of foreign matters, such as dust that floats in the air, onto the EL element (abstract). The dust particles would cause some degradation of the EL component [0046]. Because Miyazawa teaches the need to manufacture an EL display having high display quality [0195], it would have been obvious to one of ordinary skill in the art at the time of invention to have ejected the EL material of Miyazawa from below, wherein the substrate was turned upside down. One would have been motivated to do so in order to have prevented foreign matter from deteriorating the quality of the EL display.

Claims 2,22-23: Miyazawa does not explicitly teach ejecting under a pressure in a range of  $10^2$  Pa to  $10^5$  Pa, but does exemplify vacuum pressures of less than 0.133322 Pa [0092]. However, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical (MPEP 2144.05.II.A.). This decision is clearly analogous to pressure differences and other process parameters. Miyazawa teaches that the pressure of the vacuum deposition chamber is adequately less than in the nozzle, such that the ejected material is vaporized [0010]. One of ordinary skill would have recognized that any degree of vacuum that is less than the pressure in the nozzle would have been operable. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have used any degree of vacuum, including those in the claimed range, when ejecting the EL material of Miyazawa with a reasonable expectation of success because one of ordinary skill in the art would have used any chamber pressure that is less than the pressure in the nozzle.

Claim 3: Miyazawa teaches that the EL material can be in solution with a solvent, but does not explicitly teach volatilizing a solvent in the solution in a duration before the solution arrives at the electrode. However, such must necessarily occur, as discussed above.

Claims 6-7: Sekiya teaches that the substrate can be  $0^\circ$  relative to the horizontal plane (Fig. 5).

Claims 24-26: Miyazawa teaches that the EL composition is intermittently deposited through a nozzle to form a thin film [0140].

Claim 27-28: Miyazawa teaches that the EL composition is a luminescent material [0140].

7. Claims 10-11 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489 and Morii '726 as applied above, and further in view of Miyashita et al. (U.S. Publication No. 2002/0155215).

Kimura, Kawase, and Morii are discussed above. Kimura teaches a pixel electrode 141 and a top electrode 154 (Fig. 5), but does not explicitly teach which of the electrodes is a cathode and which is an anode.

Miyashita teaches an EL configuration wherein the top electrode 113 is a cathode [0060]. The pixel electrode 101 must necessarily be an anode (Fig. 1). Because Miyashita teaches that such configurations of a cathode and an anode are operable for an EL device, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed an anode as the pixel electrode and a cathode as the top electrode in the EL device of Kimura with a reasonable expectation of success. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Kimura does not explicitly teach that the cathode is formed via a sputter or evaporation method. However, Miyashita teaches that it is well known for the cathode to be formed via sputtering [0060]. It would have been obvious to one of ordinary skill in the art at the time of invention to have formed the cathode of Kimura using a sputtering method with a reasonable expectation of success because Miyashita teaches that such methods of forming a cathode are well known in the art. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Claims 22-28 are rejected for substantially the same reasons as discussed above.

8. Claims 10-11 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Sekiya '072 as applied above, and further in view of Miyashita '215.

Miyazawa and Sekiya are discussed above. Miyazawa teaches that there is no limitation on whether the bottom electrode is to be the anode or cathode and that the electrodes can be formed by any conventional method [0162].

Miyazawa does not explicitly teach that the bottom electrode 141 is an anode and that the top electrode is a cathode formed via sputtering or evaporation. However, such is obvious over Miyashita for substantially the same reasons as discussed immediately above.

Claims 22-28 are rejected for substantially the same reasons as discussed above.

9. Claims 16-17 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489 and Morii '726 as applied above, and further in view of Yamazaki (U.S. Publication No. 2002/0164416).

Kimura, Kawase, and Morii are discussed above. Kimura teaches a pixel electrode 141 and a top electrode 154 (Fig. 5), but does not explicitly teach which of the electrodes is a cathode and which is an anode.

Yamazaki teaches an EL configuration wherein the pixel electrode 106,107 is the cathode and the top electrode 109 is the anode ([0037],[0040]; Fig. 1). Because Yamazaki teaches that such configurations are operable for an EL device, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed the pixel electrode as the cathode and the top electrode as the anode in the EL device of Kimura with a reasonable expectation of success. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Kimura does not explicitly teach that the anode is formed via a sputter or evaporation method. However, Yamazaki teaches that it is well known to form the anode over the EL layer via sputtering [0040]. It would have been obvious to one of ordinary skill in the art at the time of invention to have sputtered the anode onto the EL device of Kimura with a reasonable expectation of success because Yamazaki teaches that such methods of forming an anode are well known in the art.

Claims 22-28 are rejected for substantially the same reasons as discussed above.



10. Claims 16-17 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Sekiya '072 as applied above, and further in view of Yamazaki '416.

Miyazawa and Sekiya are discussed above. Miyazawa teaches that there is no limitation on whether the bottom electrode is to be the anode or cathode and that the electrodes can be formed by any conventional method [0162].

Miyazawa does not explicitly teach that the bottom electrode 141 is the cathode and that the top electrode is an anode formed via sputtering or evaporation. However, such is obvious over Yamazaki for substantially the same reasons as discussed immediately above.

Claims 22-28 are rejected for substantially the same reasons as discussed above.

11. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489, Morii '726, and Miyashita '215 as applied to claims 10-11 above, and further in view of Konuma et al. (U.S. Publication No. 20020030443).

Kimura, Kawase, and Morii as discussed above, but do not explicitly teach that the formation of the EL layer and the cathode is performed in a multi-chamber scheme or an in-line scheme without a release to air.

Konuma teaches that EL material is extremely weak against oxidation and the slightest amount of moisture can easily accelerate the oxidation to degrade the EL material [0013]. There is a need to use an apparatus to control the environment during deposition such that the EL layers are not exposed to moisture and oxygen in the air [0021]. Konuma teaches the use of a multi-chamber scheme (Figs. 1-3) and an in-line scheme (Figs. 4A-4B). Because Kimura teaches the need for a high-quality display device, it would have been obvious to one of ordinary skill in the art at the time of invention to have formed the EL layers and the cathode of Kimura in either a multi-chamber or an in-line chamber of Konuma with a reasonable expectation of success. One would have been motivated to do so in order to have prevented degradation of the EL layer and to have manufactured a higher quality EL display.

12. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Sekiya '072 and Miyashita '215 as applied to claims 10-11 above, and further in view of Konuma '443.

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Miyazawa and Sekiya are discussed above, but do not explicitly teach that the formation of the EL layer and the cathode is performed in a multi-chamber scheme or an in-line scheme without release to air.

Miyazawa does teach the need for improving the quality of the EL display [0056]. Konuma teaches that the use of a multi-chamber or in-line deposition apparatus is obvious for substantially the same reasons as discussed immediately above.

13. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura '422 in view of Kawase '489, Morii '726, and Yamazaki '416 as applied to claim 16-17 above, and further in view of Konuma for substantially the same reasons as discussed above.

14. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazawa '311 in view of Sekiya '072 and Yamazaki '416 as applied to claim 16-17 above, and further in view of Konuma for substantially the same reasons as discussed above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Lin whose telephone number is 571-272-8902. The examiner can normally be reached on Monday thru Friday 8AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JL  
JL

  
**KEITH HENDRICKS**  
**PRIMARY EXAMINER**